

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1-46. (canceled).

47. (currently amended): An illumination system for a microlithography projection exposure system for illuminating an illumination field with light from a primary light source, the illumination system comprising:

a light distribution device which receives light from the primary light source and which produces a two-dimensional intensity distribution in a pupil-shaping surface of the illumination system,

wherein the light distribution ~~system~~ device variably sets the two-dimensional intensity distribution,

wherein the light distribution device comprises at least one optical modulation device which controllably changes ~~the~~ an angular distribution of the light incident on the optical modulation device,

wherein the optical modulation device comprises an array of individual elements that are driven individually to change an angle of radiation incident on the individual elements,

wherein, between the light source and the optical modulation device, there is arranged an optical device which concentrates radiation incident on the optical device onto the individual elements of the optical modulation device,

wherein the optical device forms a plurality of beams from the incident radiation and concentrates each of the plurality of beams onto a respective individual element of the optical modulation device, and

wherein an axicon system is arranged between the optical modulation device and the pupil-shaping surface.

48. (canceled).

49. (withdrawn): The illumination system according to Claim 47, wherein the optical modulation device is controlled such that at least substantially all of the light intensity that is incident on the optical modulation device is deflected into a usable region of the pupil-shaping surface.

50. (withdrawn): The illumination system according to Claim 47, further comprising, between the optical modulation device and the pupil-shaping surface, an optical system which converts the angular distribution produced by the optical modulation device into a spatial distribution in the pupil-shaping surface.

51. (withdrawn): The illumination system according to Claim 50, wherein the optical system has a variable focal length.

52. (withdrawn): The illumination system according to Claim 50, wherein the axicon system is incorporated into the optical system.

53. (previously presented): The illumination system according to Claim 47, wherein the optical modulation device is a reflective optical modulation device.

54. (previously presented): The illumination system according to Claim 53, wherein the reflective optical modulation device is arranged obliquely with respect to an optical axis in the manner of a deflection mirror.

55. (previously presented): The illumination system according to Claim 47, wherein, between the optical modulation device and the pupil-shaping surface, there is an optical distance such that angles between an optical axis and light beams belonging to the angular distribution in the region of the pupil-shaping surface are less than 5° .

56. (previously presented): The illumination system according to Claim 47, wherein the individual elements of the optical modulation device comprise an array of individual mirrors in at least one mirror arrangement.

57. (previously presented): The illumination system according to Claim 56, wherein at least some of the individual mirrors have a flat mirror surface.

58. (previously presented): The illumination system according to Claim 56, wherein at least some of the individual mirrors are curved mirrors with a finite mirror focal length.

59. (previously presented): The illumination system according to Claim 58, wherein the mirror focal length is dimensioned such that radiation incident on the individual mirrors strikes the pupil-shaping surface in substantially focused form.

60. (previously presented): The illumination system according to Claim 56, wherein the individual mirrors are adaptive mirrors, which are adjustable in shape.

61. (previously presented): The illumination system according to Claim 56, wherein the individual mirrors of the mirror arrangement all have the same shape and size.

62. (withdrawn): The illumination system according to Claim 56, wherein the mirror arrangement comprises a first mirror group and at least a second mirror group, each mirror group comprises at least one individual mirror, and the individual mirrors of the mirror groups have at least one of differing sizes, differing shapes and differing curvatures.

63. (currently amended): The illumination system according to Claim 56, wherein at least some of the individual mirrors of the mirror arrangement have an optical structure which forms a distribution of the radiation reflected from the respective individual mirror.

64. (previously presented): The illumination system according to Claim 63, wherein the optical structure is a diffractive optical structure.

65. (previously presented): The illumination system according to Claim 56, wherein some individual mirrors of the mirror arrangement are tilted relative to other individual mirrors of the mirror arrangement.

66. (previously presented): The illumination system according to Claim 47, wherein the optical modulation device is an electro-optical element, and the array of individual elements is selected from the group consisting of controllable diffraction gratings and acousto-optical elements.

67. (canceled).

68. (withdrawn): The illumination system according to Claim 47, wherein the optical device comprises a two-dimensional array comprising telescope lens systems.

69. (withdrawn): The illumination system according to Claim 47, wherein the optical device comprises a diffractive optical array generator which transforms an incoming beam into a plurality of light beams concentrated on individual optical elements of the optical modulation device.

70. (withdrawn): The illumination system according to Claim 69, wherein the diffractive optical array generator is a Dammann grid.

71. (withdrawn): The illumination system according to Claim 47, further comprising, between the pupil-shaping surface and a plane of the illumination field, a light mixing device which mixes the light of the intensity distribution.

72. (withdrawn): The illumination system according to Claim 71, wherein the light mixing device comprises at least one integrator rod having an entry surface, and the pupil-shaping surface lies in the region of a plane which is located upstream of the entry surface and which is a Fourier-transformed plane in relation to the entry surface.

73. (withdrawn): The illumination system according to Claim 71, wherein the light mixing device comprises at least one fly's eye condenser.

74. (withdrawn): The illumination system according to Claim 73, wherein the fly's eye condenser has an entry surface, and the pupil-shaping surface lies in the region of the entry surface or a surface which is optically conjugate with respect to the entry surface.

75. (withdrawn): The illumination system according to Claim 73, further comprising a component which controls the optical modulation device such that individual radiation channels of the fly's eye condenser are either at least substantially irradiated or at least substantially non-irradiated.

76. (withdrawn): The illumination system according to Claim 73, wherein the light distribution device comprises at least one diffractive optical element arranged optically between the optical modulation device and the pupil-shaping surface, which receives light emerging from the optical modulation device, and which modifies the light by introducing an angular distribution according to an effect function defined by the configuration of the diffractive optical element.

77. (withdrawn): The illumination system according to Claim 76, wherein a beam which emerges from an individual element of the optical modulation device is shaped by the diffractive optical element to conform to the shape and size of one single optical channel or a group of adjacent optical channels of the fly's eye condenser.

78. (withdrawn): The illumination system according to Claim 76, wherein the diffractive optical element is a computer generated hologram.

79. (withdrawn): The illumination system according to Claim 73, wherein the fly's eye condenser is not assigned any mask for the individual blocking of radiation channels.

80. (currently amended): The illumination system according to Claim 47, wherein ~~no~~ neither a fly's eye condenser nor any an integrator rod is arranged between the pupil-shaping surface and a plane of the illumination field.

81. (withdrawn): The illumination system according to Claim 47, wherein, in or in the vicinity of the pupil-shaping surface, there is arranged a raster element which shapes and homogenizes the intensity distribution in a following field plane of the illumination system.

82. (withdrawn): The illumination system according to Claim 47, further comprising a control device which drives individual elements of the optical modulation device, such that control signals which control the individual elements are varied as a function of the structure of a mask to be exposed.

83. (withdrawn): A method of producing at least one of semiconductor components and finely structured components other than semiconductor components, the method comprising:

illuminating a reticle arranged in an object plane of a projection objective with the aid of an illumination system, which comprises at least one optical modulation device comprising a plurality of individually controlled elements which change the angular distribution of radiation incident on the optical modulation device; and

producing an image of the reticle on a light-sensitive substrate;

wherein said illuminating of the reticle comprises:

concentrating radiation from a light source onto the individually controlled elements,

setting the angular distribution of the light incident on the reticle by setting at least two of the individually controlled elements in relation to each other, and

transforming the angular distribution emerging from the optical modulation device by an axicon system.

84. (withdrawn): The method according to Claim 83, wherein the individually controlled elements of the optical modulation device comprise a plurality of individual mirrors in a mirror arrangement, and the relative setting of the individually controlled elements comprises tilting at least one of the individual mirrors with respect to others of the individual mirrors about at least one tilt axis.

85. (withdrawn): The method according to Claim 83, wherein the individually controlled elements of the optical modulation device comprise a plurality of diffraction gratings, and the relative setting of the individually controlled elements comprises changing the diffraction effects of at least two of the diffraction gratings.

86. (withdrawn): The method according to Claim 83, wherein the illumination system comprises a fly's eye condenser having a plurality of radiation channels, and wherein the individually controlled elements are controlled such that radiation channels are either at least substantially completely illuminated or at least substantially completely non-illuminated.

87. (withdrawn): An illumination system for a microlithography projection exposure installation for illuminating an illumination field with light from a primary light source, comprising:

a light distribution device which receives light from the primary light source and which produces a two-dimensional intensity distribution in a pupil-shaping surface of the illumination system,

wherein the light distribution device variably sets the two-dimensional intensity distribution,

wherein the light distribution device comprises at least one optical modulation device which controllably changes the angular distribution of the light incident on the optical modulation device, and

wherein a space between the optical modulation device and the pupil-shaping surface is free of optical components.

88. (withdrawn): The illumination system according to Claim 87, wherein a distance between the optical modulation device and the pupil-shaping surface is so great that the pupil-shaping surface lies in the far-field region of the optical modulation device.

89. (withdrawn): An illumination system for a microlithography projection exposure installation for illuminating an illumination field with light from a primary light source, comprising:

a light distribution device which receives light from the primary light source and which produces a two-dimensional intensity distribution in a pupil-shaping surface of the illumination system,

wherein the light distribution device variably sets the two-dimensional intensity distribution,

wherein the light distribution device comprises at least one optical modulation device which controllably changes the angular distribution of the light incident on the optical modulation device,

wherein the optical modulation device comprises at least one mirror arrangement comprising an array of individual mirrors which are controlled individually to change an angular distribution of the light incident on the mirror arrangement, and

wherein the mirror arrangement comprises a first mirror group and at least a second mirror group, each mirror group comprises at least one individual mirror, and the individual mirrors of the mirror groups have at least one of differing sizes, differing shapes and differing curvature.

90. (withdrawn): An illumination system for a microlithography projection exposure installation for illuminating an illumination field with light from a primary light source, comprising:

a light distribution device which receives light from the primary light source and which produces a two-dimensional intensity distribution in a pupil-shaping surface of the illumination system,

wherein the light distribution device variably sets the two-dimensional intensity distribution,

wherein the light distribution device comprises at least one optical modulation device which controllably changes the angular distribution of the light incident on the optical modulation device,

wherein the optical modulation device comprises at least one mirror arrangement comprising an array of individual mirrors which are controlled individually to change an angular distribution of the light incident on the mirror arrangement, and

wherein the individual mirrors are adaptive mirrors which are adjusted in shape.

91. (withdrawn): An illumination system for a microlithography projection exposure installation for illuminating an illumination field with light from a primary light source, comprising:

a light distribution device which receives light from the primary light source and which produces a two-dimensional intensity distribution in a pupil-shaping surface of the illumination system,

wherein the light distribution device variably sets the two dimensional intensity distribution,

wherein the light distribution device comprises at least one optical modulation device which controllably changes the angular distribution of the light incident on the optical modulation device, and

wherein the optical modulation device is an electro-optical element comprising an array of individual elements, which are formed as one of controllable diffraction gratings and acousto-optical elements.

92. (new): The illumination system according to Claim 47, wherein the optical device comprises a two-dimensional raster arrangement of optical elements or a diffractive optical array generator.